LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1 – 53 (Canceled).

54. (New) A method for computing beamforming for signals in a communication system comprising:

receiving a signal having a plurality of tones over a communication channel, some of the plurality of tones being of a first type and some of the plurality of tones being of a second type;

performing channel estimation on the received signal to provide a channel estimate of the communication channel;

estimating noise on the received signal for each of a plurality of the first type of tones to provide a corresponding noise estimate for each of the plurality of the first type of tones; and

computing beamforming for at least one tone of a plurality of the second type of tones based on the channel estimate and based on the noise estimate of at least one of the plurality of the first type of tones that is nearest the at least one tone of the plurality of the second type of tones in the received signal.

55. (New) A method according to claim 54, wherein the estimating noise further comprises:

computing a first indication of difference between a first one of the first type of tones in one burst relative to the first one of the first type of tones in a preceding burst;

computing a second indication of variance and correlation of the first indication; and

averaging the second indication over time to provide an average indication of noise that defines the noise estimate for at least one of the plurality of the first type of tones.

56. (New) A method according to claim 33, wherein

the received signal is a multi-carrier signal;

the first type of tones are training tones; and

the second type of tones are data tones.

57. (New) A method according to claim 54, further comprising:

indexing the plurality of the first type of tones;

indexing the plurality of the second type of tones;

selecting at least one of the plurality of the first type of indexed tones that is nearest a given indexed second type of tone in the received signal; and

the beamforming being computed for the given indexed second type of tone based at least in part on corresponding noise estimates of the selected first type of indexed tones that is nearest the given indexed second type of tone in the received signal.

58. (New) A method according to claim 54, wherein the computing beamforming further comprises:

computing at least one of soft decisions and noise to signal ratio estimates for the at least one of the plurality of the second type of tones.

59. (New) A method according to claim 54, wherein the performing channel estimation further comprises:

extracting the plurality of the first type of tones from the received signal, the channel estimation being performed based on the plurality of the first type of tones extracted from the received signal;

the estimating noise being performed for each of the plurality of the first type of tones extracted from the received signal.

60. (New) A communication receiver configured to compute beamforming for signals in a communication system comprising:

means for receiving a signal over a communication channel, wherein the signal comprises a plurality of tones, the plurality tones comprising a plurality of a first type of tones and a plurality of second type of tones;

means for determining a channel estimate for the communication channel;

means for estimating noise for a plurality of the first type of tones in the received signal; and

means for computing beamforming for at least one of a plurality of the second type of tones based on the determined channel estimate and the estimated noise of at least one of the plurality of the first type of tones that is nearest a respective one of the plurality of the second type of tones in the received signal.

61. (New) A communication receiver according to claim 60, further comprising:

means for computing a first indication of difference between a first one of the first type of tones in one burst relative to the first one of the first type of tones in a preceding burst;

means for computing a second indication of variance and correlation of the first indication; and

means for averaging the second indication over time to define the estimated noise of the at least one of the plurality of the first type of tones.

62. (New) A communication receiver according to claim 60, wherein

the signal is a multiple carrier signal;

the first type of tones are training tones; and

the second type of tones are data tones.

63. (New) A communication receiver according to claim 60, further comprising:

means for indexing the plurality of first type of tones;

means for indexing the plurality of second type of tones;

means for selecting the at least one of the plurality of the first type of indexed tones that is nearest a given indexed second type of tone in the signal; and

the means for computing beamforming computes the beamforming for the given indexed second type of tone based at least in part on the noise estimation of the selected first type of indexed tones that is nearest the given indexed second type of tone in the signal.

64. (New) A communication receiver according to claim 60, wherein the beamforming further comprises at least one of soft decisions and noise to signal ratio estimates computed by the means for computing beamforming for the at least one of the plurality of the second type of tones.

65. (New) A communication receiver comprising:

a tone extractor configured to extract a plurality of first type of tones from a signal received over a communication channel;

a channel estimator configured to provide a channel estimate for the communication channel;

a nose estimator configured to estimate noise for the extracted plurality of the first type of tones and provide a noise estimate for the plurality of the first type of tones; and

a beamformer configured to compute beamforming for a plurality of a second type of tones in the received signal based on the channel estimate and based on the noise estimate of the extracted plurality of the first type of tones that are nearest to respective ones of the second type of tones in the received signal.

66. (Previously Presented): A communication receiver according to claim 65, wherein the noise estimator comprises:

an index operative to index through the plurality of the first type of tones;

a first noise estimation portion operative to compute a first indication of a difference between an indexed tone of the plurality of the first type of tones in one burst relative to an indexed tone of the plurality of the first type of tones in a preceding burst;

a second noise estimation portion operative to compute a second indication of variance and correlation of the first indication computed by the first noise estimation portion; and

a time averager operative to average the second indication computed by the second noise estimation portion over time to define the corresponding noise estimates for the plurality of the first type of tones.

67. (New) A communication receiver according to claim 65, wherein
the received signal is a multiple carrier signal;
the first type of tones are training tones; and
the second type of tones are data tones.

68. (New) A communication receiver according to claim 66, further comprising:
an indexing function that selects an indexed second type of tone from the plurality of the second type of tones for which a current beamforming computation is to be performed; and
a noise selection function operative to select one of the plurality of the first type of tones nearest to the indexed second type of tone, the respective beamforming computation for the indexed second type of tone employing the computed noise estimation for the selected one of the plurality of the first type of tones.

69. (New) A communication receiver according to claim 65, wherein the beamformer is further configured to compute at least one of soft decisions and noise to signal ratio estimates for at least some of the second type of tones.

70. (New) A communication receiver of claim 65 being implemented as part of an application specific integrated circuit.

71. (New) A communication receiver of claim 65 being implemented as executable instructions programmed in a digital signal processor.

72. (New) A communication receiver of claim 65, wherein the plurality of the first type of tones are interspersed throughout the received signal and fewer in number than the plurality of the second type of tones in the received signal.

73. (New) A wireless communications system, comprising:

at least one antenna operative to receive a wireless signal over a communication channel and convert the received signal into a corresponding electrical signal;

a preprocessing system operative to process the electronic signal and convert the corresponding electrical into a digital signal and perform desired preprocessing of the digital signal to provide a preprocessed digital signal in the frequency domain having a plurality of tones, some of the plurality of tones being of a first type and others of the plurality of tones being of a second type, the tones of the first type having a fewer number of tones than the tones of the second type;

a channel estimator operative to characterize the communication channel and provide a channel estimate thereof;

a noise estimator operative to estimate noise for tones of the preprocessed digital signal of the first type and to provide an indication of estimated noise for the tones of the first type; and

a beamformer operative to perform beamforming computations for tones of the first preprocessed digital signal of the second type, the beamforming computations employing the channel estimate and the indication of estimated noise for a tone of the first type nearest each respective tone of the second type.

74. (New) The system of claim 73, wherein the tones of the preprocessed digital signal conforming to a multiple carrier modulation technique in which the first type of tones corresponds to training tones and the second type of tones corresponds to data tones.